

SOUTHEASTERN  
REGIONAL  
BIOMASS ENERGY  
PROGRAM

# SERBEP Update

SEPTEMBER 1995

A Publication for  
the General  
Biomass  
Community

The Southeastern Regional Biomass Energy Program is one of five regional biomass energy programs. It is administered for the U.S. Department of Energy Office of National Programs by the Tennessee Valley Authority's Environmental Research Center in Muscle Shoals, Alabama. The 13-state region includes Florida, Kentucky, Mississippi, Georgia, North Carolina, South Carolina, Virginia, West Virginia, Missouri, Tennessee, Louisiana, Arkansas, and Alabama.

For More Information  
Contact:  
Phillip Badger, Manager  
(205) 386-3086

David Stephenson,  
Assistant Manager  
(205) 386-3087

fax (205) 386-2963

## **Biodiesel Blends Are Least Cost Alternative**

A paper presented at the recent American Society of Agricultural Engineers (ASAE) Annual Meeting should have major implications for operators of large municipal and federal government diesel fueled fleets. Most large metropolitan areas in the U.S. are under mandates to improve their air quality, and fleet conversion is one way to meet these mandates. Operators of large federal government fleets are under similar mandates.

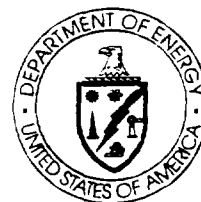
This paper compares the costs of converting diesel fleets to alternative fuels to meet state and federal clean air standards. The paper shows that if all costs are considered—direct fuel cost, fueling facility construction and maintenance cost, and vehicle replacement cost—blends of 20% Biodiesel/diesel at current market prices are the least-cost annualized option.

The paper was presented by Earle E. Gavett, retired head of the USDA Office of Energy and now a consultant to the National Biodiesel Board. The paper compared conventional diesel as the base case against 20% Biodiesel/diesel blends, compressed natural gas (CNG), liquified natural gas (LNG), liquified petroleum gas (LPG or Propane), ethanol, and methanol options. Biodiesel is made from vegetable oils (such as from soybeans, rapeseed, or peanuts), animal fats (such as tallow), or recycled oils (such as used French fry oil).

To make comparisons, capital and operating costs were developed for two different types of fleets—a medium-duty truck fleet and a heavy-duty transit bus fleet. The results for transit buses are shown in Table 1 and indicate that the total annualized cost over a 15-year period for CNG was 60% higher than for a 20% blend of Biodiesel when Biodiesel was selling for \$2.50 per gallon. The other alternative fuels were even more costly.

An additional important benefit is that Biodiesel blends and their vehicle storage tanks weigh less than the other alternatives, thus allowing for better vehicle mileage and increased carrying capacity. The combined tank and fuel weight of Biodiesel to achieve a 330-mile range is 819 lbs. versus 1,278 lbs. for ethanol and 3,056 lbs. for CNG.

Some other advantages of Biodiesel include no requirement for engine, refueling station, or maintenance facility modifications. Table 2 summarizes these advantages for transit buses.



Please let us know of others who would like to receive this update publication on a monthly basis. Also, let us know if you are currently receiving this information and wish your name removed from our mailing list.

**U.S. Department of Energy (DOE) National Clean Cities Stakeholders Meeting and Conference--DOE announces its 1995 National Clean Cities Stakeholders Meeting and Conference in St. Louis, Missouri, September 10-13, 1995. This first stand-alone conference for DOE's Clean Cities Program will give Clean Cities stakeholders and others interested in alternative fuels a chance to participate in a series of interactive workshops on a variety of issues. The Clean Cities Program promotes local public/private partnerships to advance the use of alternative transportation fuels. The conference will also include an exhibition hall with displays from designated Clean Cities and stakeholders. For information on registration, exhibition, and sponsorship, call the Clean Cities Hotline at 1-800-CCITIES (800-224-8437).**

Table 1. Total Annualized Cost for the Various Alternatives								
	Clean Diesel	20% Biodiesel \$1.75	\$2.50	CNG	LNG	LPG	Methanol	Ethanol
<b>Transit Bus Fleet</b>								
Incremental Fuel Costs	\$0	\$442,105	\$757,895	(\$33,684) <sup>2</sup>	\$439,359	\$526,316	\$1,564,290	\$1,553,986
Cost of Compression	-	-	-	\$138,868	-	-	-	-
Incremental Fuel Facility Maintenance Costs	\$0	\$0	\$0	\$78,000	\$22,000	\$1,000	\$1,000	\$1,000
Incremental Fuel Station Cost, Amortized <sup>1</sup>	\$0	\$0	\$0	\$192,685	\$115,611	\$52,988	\$33,720	\$33,720
Incremental Annual Fleet Replacement Cost	\$0	\$0	\$0	\$833,333	\$750,000	\$666,667	\$333,333	\$333,333
<b>Total Added Cost</b>	<b>\$0</b>	<b>\$442,105</b>	<b>\$757,895</b>	<b>\$1,209,202</b>	<b>\$1,326,970</b>	<b>\$1,246,971</b>	<b>\$1,932,344</b>	<b>\$1,922,039</b>

<sup>1</sup>) Amortized at 5% over 15 years

<sup>2</sup>) Numbers in ( ) indicate a cost savings

Table 2. Comparison of Capital Costs and Vehicle Prices					
	Diesel/Biodiesel	CNG	LNG	LPG	Methanol/Ethanol
Transit Bus Fleet	0	\$2,000,000	\$1,200,000	\$550,000	\$350,000
Transit Bus Prices	\$210,000	\$260,000	\$255,000	\$250,000	\$230,000

Although not discussed in the paper, the use of locally produced fuels such as Biodiesel can provide significant economic development benefits to communities and our nation. Communities benefit as funds for energy expenditures are retained locally and used repeatedly in the community. The associated economic growth creates jobs, income, and tax revenues. Our nation benefits from a decreased dependence on foreign energy sources and reductions in trade deficits.

A copy of Gavett's paper "Cost Competitiveness of Biodiesel Fuel" (Paper No. 95-6164) can be obtained from the American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, Michigan 49085-9659, phone (616) 429-3852. Gavett can be reached at 2608 Bowling Green Drive, Vienna, Virginia 22180-7027, phone (703) 560-4195.

### Landfill Gas Back On Track

Landfill gas collection has undergone a minor resurrection lately, with regulatory changes and environmental factors, rather than energy-production, as the driving force, although energy-production remains in the plans of most existing and new projects. Landfills produce a biogas containing about equal quantities of methane and carbon dioxide with a small amount of water

and hydrogen sulfide and with trace amounts of other gases, some toxic, lumped together as non-methane organic compounds (NMOC). The gas comes from the anaerobic digestion of organic materials — household garbage, yard waste, and papers — as oxygen is depleted, which may be in a matter of weeks, months, or years after closure, depending on such factors as the composition of the material, degree of compaction, and climate. The gas has a heating value of about 500 Btu/ft<sup>3</sup>, about one-half that of natural gas, and can be used in boilers to produce heat or engines to produce electricity.

A recent study by SCS Engineers of Reston, Virginia, for the Northeastern Regional Biomass Energy Program summarizes the present status, focusing on the Northeast. It provides a good synopsis of collection and utilization methods, future applications, economics, and federal regulations and incentives, much of it applicable to the nation as a whole.

Serious consideration of collecting landfill gas to produce energy began in the early 1970s with natural gas shortages and the beginning of energy shortages. The idea of collection really took off in the late 1970s when these shortages became the energy crisis, sending energy costs skyward and legislators to their chambers. A spate of federal and state incentives for biomass en-

ergy, not the least of which was PURPA, the 1978 Public Utility Regulatory Policies Act that required utilities to buy power from non-utility generators at the utility's avoided cost of producing it themselves. At the time utilities were looking at rising demands, electricity shortages, and energy costs doubling or tripling in the next decade. Some hesitantly signed long-term contracts — necessary for independent producers to finance a project — at 10¢/kWh (kilowatt-hour) or more. This produced prospects of a handsome profit for the independent producers. For example, 6¢/kWh or so is usually profitable for landfill gas projects.

Between 1980 and 1986 active and planned landfill gas projects jumped from 16 to 138. Then everything went into reverse. The "bubble" of surplus natural gas projected to burst in the 1980s moved along with the years and continued to swell. Energy costs fell, as did electricity demand projections, and generation grew more efficient. Utilities found their avoided costs falling to less than 4¢/kWh and began offering avoided costs of 2 or 3¢/kWh. (They also found themselves locked into long-term contracts, some extending well into the 21st century, to buy power at 4 or 5 times the cost of their own production, and left them even less favorable toward PURPA.) By 1991 active and planned landfill gas projects had only increased to 157 and planned projects had declined by almost 50 percent.

In 1992 landfill gas projects began to increase again, this time driven by regulatory pressures and environmental concerns. Both RCRA revisions and the 1990 Clean Air Act revisions require gas collection for many landfills, partly for environmental reasons and partly for safety. Thirty landfill gas explosions in the past 25 years, several causing deaths and injuries, led to RCRA monitoring requirements and sometimes collection if emissions are remotely near explosive limits. The Clean Air Act Amendments call for collection to control odors, reduce methane emissions that increase global warming, and reduce potential health hazards from NMOCs. In some cases state

regulations are more restrictive than EPA's, a further incentive to gas collection.

Few landfill operators now installing collection systems expect a profit as did those of the 1970s and 1980s, though some in particular circumstances are able to, even making a profit at 3¢/kWh electricity in one case. Most make what use of it they can and select the least cost means of disposing of the rest.

In 1994 77 percent of landfill gas projects generated electricity, 14 percent sold the gas to a user, 4 percent did both, 4 percent upgraded to pipeline quality, and the remaining producers used it for soil remediation or chemical production. These uses represent the types and percentages of landfill gas use over the last two decades. Selling the gas to a nearby user, usually at 75 to 90 percent of the cost of the fossil fuel replaced on a Btu basis, is economically feasible within about a two-mile radius of the landfill, preferably a production plant or similar user who has a constant, seven-day per week demand to avoid flaring. Cleaning the gas to pipeline quality is complicated and rarely profitable at today's low gas prices. One novel use is a low-cost source of heat for baking hydrocarbon polluted soil.

Electrical generation is accomplished using generators driven by internal combustion engines or (73 percent), gas turbines (17 percent), steam turbines (7 percent), combined cycle turbines (2 percent), or combinations of these. Landfill electricity production is now about 400 megawatts and about 245 megawatts more is expected to come on-line within the next two years. This, from a handful of the total landfill sources, illustrates the dimensions of the potential resources: 500 megawatts represents a typical modern utility generating unit.

The common collection systems use vertical borings, typically 2 feet in diameter, containing two 8-inch plastic pipes perforated in the lower section, and backfilled with stones. Typical well depths are 25 to 75 feet deep spaced 50 to 300 feet apart. Sometimes leachate collection is combined with gas collection using submersible

#### **American Energy Crop Association**

**Meeting**—The American Energy Crop Association (AECA) has announced that it will hold its next meeting September 12-13, 1995, in St. Louis, MO. This meeting is an opportunity to solidify the gains being made in advocating a use of CRP land for energy crop production, the many contacts that are being established across the nation among farmers and end users and suppliers, the favorable reception among an increasing number of policy makers, and the emerging coalition of environmentalists, farmers, and businesses who realize that biomass energy can help reduce our dependence upon imported petroleum. Registration fee for the meeting is \$75. For more information, contact AECA, Attn: Daniel Hines, 1018 North Bompert, St. Louis, MO 63119. (314) 962-4307, fax (314) 962-1057.

### Utility Coal-Biomass Co-Firing--The

Northeast Regional Biomass Energy Program (NERBEP) has selected Antares Group to conduct its assessment of co-firing biomass with coal in utility boilers. Antares Group will work closely with the engineering firm of Gilbert/Commonwealth to determine the nuts-and-bolts feasibility of co-firing at given sites, and to respond to plant managers' questions and concerns. New York State Electric and Gas (NYSEG), Niagara Mohawk Power Corporation (NMPC), and General Public Utilities (GPU) have indicated their willingness to work with Antares, Gilbert/Commonwealth, and the NERBEP in evaluating the feasibility of co-firing biomass with coal. This project is just beginning so limited additional information is available. For additional information, contact Rick Handley, Northeast Regional Biomass Energy Program, CONEG Policy Research Center, Inc., 400 N. Capitol St., Suite 382, Washington, DC 20001, (202) 624-8454, fax (202) 624-8463.

pumps in the lower section. In active landfills it is also possible to build in excavated trenches filled with gravel and containing slotted or perforated pipes. A vacuum pump draws from a manifold connecting the wells and supplies it to a central point.

Gas recovery projects have been installed on both large and small landfills ranging from 3,000 to 20 acres in size and 200 to 11 feet in depth, with 570 to 4 acres devoted to gas recovery. The number of collection wells ranges from 1,200 to 7. The mean is 207 acres, 84 feet deep, with 106 acres devoted to gas recovery using 69 collection wells. The industry rule of thumb cost for a complete collection system is about \$10,000 per acre.

According to a *Waste Age* survey, costs of a complete system with 1 megawatt of electricity generation have ranged from \$850,000 to \$4,500,000 with an average cost of \$1,500,000. About 75 percent of the total is for processing equipment and 25 percent is for the collection system. Actual costs of installed systems have ranged from \$120,000 to \$38,000,000 with an average of \$5,900,000. Operating costs are relatively low, averaging \$622,000, according to the survey.

With environmental requirements and safety paving the way, landfill gas appears to be back on track as an increasingly significant energy source. Both regulatory and economic forces favor gas collection. Collection technology and increased experience have improved efficiencies. (The average gas flow per landfill has increased from 1.9 million ft<sup>3</sup>/day in 1984 to 2.7 ft<sup>3</sup>/day in 1994 while average acres of collection have declined.) There is also a trend to larger, more sophisticated landfill operations, which should continue into the future.

A copy of the report, *Implementation Guide for Landfill Gas Recovery Projects in the Northeast--State of the Landfill Gas Recovery Industry*, is available for a nominal charge from Rick Handley, Northeast Regional Biomass Energy Program, CONEG Policy Research Center, Inc., 400 N. Capitol Street, Suite 382, Washington, DC

20001, phone (202) 624-8454, fax (202) 624-8463.

### Environmental Externalities: Capturing the Total Biomass Fuel Cycle

Approaches used by public utility commissions and utilities for evaluating environmental externalities have typically failed to include the total fuel-cycle perspective necessary to adequately address biomass power impacts, such as benefits of carbon uptake involved in biomass growth and production. To facilitate a fairer comparison of biomass power with respect to other conventional power options, the Northeast Regional Biomass Energy Program last year launched a study aimed at:

- reviewing current state regulatory approaches;
- presenting quantitative and qualitative information on biomass total fuel-cycle effects; and
- suggesting methods for incorporating these total fuel-cycle effects into utility considerations during the resource selection process.

DynCorp EENSP, Inc., was selected to conduct the study. Highlights of DynCorp's findings are briefly summarized below.

*Current state regulatory approaches.* Of those utility regulatory commissions endeavoring to internalize externalities, the basic types of approach include: emissions standards and control technologies (command-and-control); emissions permits and green pricing (market-based); and renewable set-asides, green RFPs, and ranking and weighing (planning-based). Market-based approaches that apply quantified externality adders in resource evaluations have tended to favor demand-side management (DSM) and natural gas generation over biomass power and other renewable technologies, focusing on combustion emissions of CO<sub>2</sub>, NO<sub>x</sub>, particulates, and other pollutants. Yet this approach neglects the primary societal reason for addressing CO<sub>2</sub>, which is the net impact of greenhouse gas emissions. To capture this, it is necessary to consider the "upstream" impacts of

biomass fuel use as well as the combustion impacts. To date, only the Connecticut, Massachusetts, and Vermont utility commissions have recognized these impacts, though none has attempted to quantify them. A review of utility requests for proposals (RFPs) and integrated resource plans (IRPs) revealed only one utility, Rochester Gas & Electric, which has incorporated total fuel-cycle impacts into its evaluations.

*Quantifying and qualifying total fuel-cycle effects.* A comparative review of biomass stoker and integrated gasifier combined-cycle technologies against coal and natural gas technologies concludes that, with on- and off-site total fuel-cycle impacts included, biomass has the most favorable results in carbon dioxide emissions per GWh. Biomass also exhibits economic externalities worthy of note: a 25-MW plant can generate a net annual income of \$10-20 million, and support over 200 jobs in a local economy. Other benefits of biomass power include: reduced acid rain emissions; waste management benefits; higher timber resource values; enhanced energy security; and sustainable development.

*Suggested methods for incorporating total fuel-cycle effects.* The study concludes with recommendations for better addressing the total fuel-cycle impacts of biomass power in policy forums. Policy-makers are urged to:

- Consider the risks of future CO<sub>2</sub> limits, land-use constraints, other health and environmental factors, and higher natural gas prices in recommending/promoting/developing resource evaluation methodologies.
- Support the adoption of zero-based IRPs (those that put existing capacity on the table along with new capacity options).
- Explore specific externality targets for power production from renewables, such as biomass, where performance-based rates are to be used (rather than cost-based rates); and, if FERC implements wholesale wheeling rules, to explore incorporation

of externality factors/fees into transmission tariffs.

- Encourage diversified portfolios through Green RFPs and set asides and encourage utilization of existing renewables via green pricing and green dispatch; and, if retail wheeling becomes a reality, explore green product differentiation as a marketing tool.

A copy of the report, *Capturing Environmental and Economic Externalities: Evaluating the Total Fuel Cycle Impacts of Biomass*, is available for a nominal charge from Rick Handley, Northeast Regional Biomass Energy Program, CONEG Policy Research Center, Inc., 400 N. Capitol Street, Suite 382, Washington, DC 20001, phone (202) 624-8454, fax (202) 624-8463.

### **Progress Report on the Economy of Centralized Biogas Plants**

The Danish Energy Agency has published a *Progress Report on the Economy of Centralized Biogas Plants*. Since 1987, development efforts concerning centralized biogas plants in Denmark have been carried out within the framework of two programs: the Action Program for Centralized Biogas Plants which was implemented between 1988 and 1991, and a further Follow-up Program which is to be concluded in 1995. The objective of the Danish development program is to verify the economic performance of centralized biogas plants and assess whether or not in the long run it will be possible to establish such plants without public investment grants. This report is a progress update on the Follow-up Program. Its main focus is on the economic results of 10 centralized plants, all of which have been in operation for several years. Final, official conclusions from the Follow-up Program will be drawn at the end of 1995.

A free copy of this report, *Progress Report on the Economy of Centralized Biogas Plants*, February 1995, may be obtained from Soren Tafdrup, Danish Energy Agency, 11 Landemaerket, DK 1119 Copenhagen K, DENMARK.

### **Proceedings Available**

Proceedings are now available from the *Commercialization of Biodiesel--Establishment of Engine Warranties* workshop, which was held in November 1994 in Idaho. The workshop program included sessions on procedures for establishing warranties, characterization of biofuels, results of engine testing research, reports of on-road tests with biodiesel, availability and outlook for biodiesel, and identifying issues and establishing a strategic plan. The workshop was of particular interest to engine manufacturers, biodiesel suppliers, transit authorities, biodiesel research and extension workers, and energy specialists. Copies of the proceedings may be obtained from Susan Hess, National Center for Advanced Transportation Technologies, University of Idaho, Moscow, ID 83844-1026, phone (208) 885-0576.

**Urban Wood Waste Studies**—The Great Lakes Regional Biomass Energy Program recently published a series of studies on the use of urban wood waste in the Great Lakes states. M. L. Smith Environmental, Inc., of Tinley Park, IL, produced the *Study of Processing and Utilizing Urban Wood Waste and Pallets for Fuel* for IL, IA, MN, OH, and WI. Smith produced a separate report for each of these five states. Each report addresses the types and quantities of wood waste available in each metropolitan area, the current disposition of the waste, potential methods and costs of processing the waste for use as fuel, potential energy markets, and environmental and regulatory issues. Similar reports were produced for MI, *Urban Wood Waste in Michigan: Supply and Policy Issues*, by Public Policy Associates of Lansing, MI; and for IN, *Urban Wood Waste Resource Assessment for the State of Indiana*, by NEOS Corporation of Lakewood, CO. Copies of the report *Study of Processing and Utilizing Urban Wood Waste and Pallets for Fuel* are available at no cost from Fred Kuzel, GLRBEP, Council of Great Lakes Governors, 35 E. Wacker Dr., Suite 1850, Chicago, IL 60601. (312) 407-0177. fax (312) 407-0038. Specify whether you want the report for IL, IA, MN, OH, or WI.

### House Bill Introduced To Extend Section 29 Credit

On July 31, 1995, House Ways and Committee Member, Nancy L. Johnson (R-Conn.), introduced legislation (HR 2146) that would extend for four more years the IRC Section 29 tax credit for production and sale of gas from biomass and synthetic fuels from coal. The bill would extend the Section 29 credit to facilities which are placed in service through December 31, 2000. The credit life, or credit expiration date, would also be extended until December 31, 2011. The changes are summarized as follows:

Applicable Dates	Present Law	Proposed Change
Contract Date	Dec 31, 1995	Requirement Deleted
Placed in Service Date	Dec 31, 1996	Dec 31, 2000
Credit Expiration Date	Dec 31, 2007	Dec 31, 2011

Additionally, the bill would relax the unrelated party requirement with respect to coal fuel projects and biomass gasification projects which produce fuels for cogeneration. Taxpayers would qualify for the Section 29 credit with respect to fuels consumed to generate electricity which is sold to an unrelated party. Under current law, the coal fuel or gas itself must be sold to an unrelated party in order to qualify for the credit. This change would apply to electricity sales occurring after the date of enactment.

When Section 29 was originally enacted as part of the 1980 Windfall Profit Tax Act, the intent was to encourage alternative energy projects in order to develop alternative fuels technologies and sustain an alternative fuels industry. In May of this year, Cynthia G. Beerbower, Deputy Assistant to the Secretary of Treasury, issued a statement against extension of the credit on the basis that Section 29 had fulfilled its intended purpose. While Ms. Beerbower's assessment of Section 29 may be the subject of future debate, Ms. Johnson's bill is motivated by policy considerations which were not addressed by Ms. Beerbower, and which were not considered when the credit was originally enacted. When introducing her bill, Ms. Johnson stated that the Section 29 credit should be

extended due to the "important environmental benefits" which are achieved by using biomass gas. As an example of environmental benefits achieved by Section 29, Ms. Johnson cited the importance of continuing to collect and utilize landfill gas, which is a "dangerous greenhouse gas that might otherwise be released into the atmosphere." Essentially, the credit extension would help further the policy of the Landfill Methane Outreach Program, created last year by the U.S. Environmental Protection Agency, as well as the Administration's commitment to maintain greenhouse gas emissions at 1990 levels, according to Ms. Johnson.

The environmental benefits of extending Section 29 are equally applicable to other biomass gas technologies. Thermal gasification of wood and agricultural residues is an efficient method of disposing of wastes which might otherwise end up in landfills, and the SO<sub>2</sub>, NO<sub>x</sub>, and other emissions from thermal gasification are typically far below that of conventional fuels, such as coal. Furthermore, greenhouse gases emitted from such biomass gasification processes may be considered as merely replacement of the gases previously absorbed by the trees or crops used as feedstocks. Therefore, the environmental effects are neutral. Additionally, the use of gases from anaerobic digestion of agricultural waste results in the elimination of methane, and has environmental benefits essentially identical to that of landfill gas recovery systems.

Despite Ms. Johnson's relevant policy considerations, the future of her bill remains uncertain. Apparently, the bill was not included as part of budget legislation or other tax legislation. Accordingly, she may need additional support from her colleagues to advance the bill in the House.

*The authors of this article are Greg Sanderson, an attorney at Gornel & Davis, and Steve Segrest, an alternative energy consultant in Atlanta. For further information you may contact Greg at (404) 223-5900, or Steve at (404) 451-5469.*

## Calendar of Events

**September 10-13, 1995**

St. Louis, Missouri  
*DOE National Clean Cities  
 Stakeholders Meeting and Conference*  
 Linda Bluestein, Clean Cities, P.O. Box  
 12316, Arlington, VA 22209  
 tel (703) 528-1222  
 Fax (703) 528-1953

**September 12-13, 1995**

St. Louis, Missouri  
*American Energy Crop Association,  
 Energy from Agriculture—America's  
 New Wealth*  
 Daniel Hines, AECA, 1018 North  
 Bompert, St. Louis, MO 63119  
 tel (314) 962-4307  
 fax (314) 962-1057

**September 19-20, 1995**

Madison, Wisconsin  
*1995 Forest Products Research  
 Conference. Environmental  
 Technology and Wood Products:  
 Challenges for the Future*  
 tel (608) 231-9244  
 fax (608) 231-9592

**September 20, 1995**

Orangeburg, South Carolina  
*Southeastern Energy Society Meeting,  
 South Carolina Electric & Gas tour of a  
 370MW Pulverized Coal Generating  
 Facility*  
 SEES % GSPE, Suite 226, 1900  
 Emery St., NW, Atlanta, GA 30318  
 tel (404) 355-0177  
 fax (404) 355-0178

**September 28-29, 1995**

Albany, New York  
*Reclaim 95—3rd Annual Conference  
 on Landfill Mining*  
 Richard Will, The Coordinate Group,  
 Inc., Box 3356, Warrenton,  
 VA 22186-1956  
 tel (703) 347-4500  
 fax (703) 349-4540

**October 12-13, 1995**

Denver, Colorado  
*Integrating Renewable Energy  
 Technologies with Gas Turbine  
 Systems*  
 Mark Menos, NREL, 1617 Cole  
 Boulevard, Golden, CO 80401  
 tel (303) 384-7458  
 fax (303) 384-7495

**October 23-26, 1995**

Baltimore, Maryland  
*Wastecon 1995, SWANA's 33rd  
 Annual International Solid Waste  
 Exposition*  
 SWANA, P.O. Box 7219, Silver Spring,  
 MD 20907-7219  
 tel (301) 585-2898  
 fax (301) 589-7068

**November 7-9, 1995**

Chicago, Illinois  
*1995 Consortium for Plant  
 Biotechnology Research Symposium*  
 Dorin Schumacher, 1220 Potter Drive,  
 Ste 130-D, West Lafayette, IN  
 47906-1383  
 tel (317) 463-4000  
 fax (317) 497-3168

**November 14-15, 1995**

Arlington, Virginia  
*8th International Incinerator Ash  
 Management Conference*  
 Coordinate Group, Box 3356,  
 Warrenton, VA 22186-1956  
 tel (703) 347-4500  
 (800) 627-8913  
 fax (703) 349-4540

**November 14-16, 1995**

Washington, D.C.  
*First Joint Annual Meeting of the  
 National BioEnergy Industries  
 Association and the Utility Biomass  
 Energy Commercialization Association*  
 Angela Barbara, UBECA, (202)  
 296-8663, fax (202) 223-5537 or  
 Brandy Smith, NBIA, (202) 383-2540,  
 fax (202) 383-2670.

**1996****April 14-17, 1996**

Sun City, South Africa  
*11th International Symposium on  
 Alcohol Fuels*  
 Professor R. K. Dutkiewicz, Energy  
 Research Institute, University of Cape  
 Town, P.O. Box 207, Cape Town,  
 7800, South Africa  
 fax (27) (021) 705-6266

**May 20-24, 1996**

Banff, Canada  
*Developments in Thermochemical  
 Biomass Conversion*  
 Dr. Tony Bridgwater, Energy  
 Research Group, Aston University,  
 Birmingham B47ET, United Kingdom  
 tel: +44 121 359 3611 ext. 4647  
 fax: +44 121 359 4094

**June 24-27, 1996**

Copenhagen, Denmark  
*9th European Bioenergy Conference*  
 DIS Congress Service Copenhagen  
 A/S, Herlev Ringvej 2C, DK-2730,  
 Herlev, Denmark  
 fax +45 - 4492 5050

**July 14-18, 1996**

San Diego, California  
*Fifth World Congress of Chemical  
 Engineering*  
 AIChE Service Center, 345 East  
 47th St., New York, NY 10017-2395  
 tel (212) 705-7373  
 fax (212) 705-8400

**September 15-17, 1996**

Nashville, Tennessee  
*ASAE Liquid Fuel and Industrial  
 Products From Renewable Products*  
 Susan Buntjer, ASAE, 2950 Niles Rd.,  
 St. Joseph, MI 49085-9659  
 tel (616) 428-6327  
 fax (616) 429-3852  
 e-mail buntjer@asae.org

**September 15-19, 1996**

Nashville, Tennessee  
*Bioenergy '96--The Seventh National  
 Bioenergy Conference*  
 Phillip Badger, TVA Southeastern  
 Regional Biomass Energy Program,  
 Muscle Shoals, AL 35662-1010  
 tel (205) 386-2925  
 fax (205) 386-2963



*SERBEP Update*

Southeastern Regional Biomass Energy Program  
Tennessee Valley Authority, CEB 3A  
P.O. Box 1010  
Muscle Shoals, AL 35662-1010  
(Express Mail Zip Code 35661)

The use of trade names is for information purposes only and does not imply endorsement, nor does the omission imply lack of endorsement, by the federal government.

✕

### **More on Slagging**

As a result of last month's *SERBEP Update* article on slagging, a combustion engineer with experience in the use of additives for mitigating slagging has offered an opportunity for those experiencing slagging and deposit problems. He will provide additives for the cost of transporting the material for testing in your boiler. If the use of additives does mitigate the slagging problem, the additive user agrees to reimburse the engineer his normal fees for this service.

The engineer says the additive does not eliminate slagging but keeps it from hardening and becoming sticky. Thus, the material will not provide a hard coat on combustion and boiler surfaces, but will allow the material to drop to the boiler floor in a loose form where it can be easily removed. The engineer says that he has successfully used additives to mitigate deposits from sawdust, wood containing resins (e.g., plywood, particleboard), plastics, rice hulls, bagasse, municipal solid waste, and other fuels. For additional information, contact Charles Sallman at (219) 462-2825.

### **Bioenergy '96--The Seventh National Bioenergy Conference**

*Bioenergy '96* will be held September 15-19, 1996, at the Opryland Hotel in Nashville, Tennessee. The ASAE Third Liquid Fuel Conference will be conducted jointly with *Bioenergy '96* and registrants will be able to attend both conferences at no additional cost.

The focus of *Bioenergy '96* will be on success stories and commercial applications of biomass energy. The conference will include general sessions with invited speakers, sessions on specific topics, a poster session, trade show, and updates on research programs. Conference proceedings will be published and will be available at registration. Conference attendees will have the option of visiting various bioenergy facilities at the end of the conference.

For trade show information, contact William Miller, (916) 927-1770. For conference information, contact Phillip Badger, TVA SERBEP, P.O. Box 1010, CEB 3A, Muscle Shoals, AL 35662-1010, (205) 386-2925.

